

1. All work shall comply with the following codes and standards:
a. National Electrical Code (NEC)
b. National Fire Protection Association (NFPA) - NEC
c. National Electrical Manufacturers Association (NEMA)
d. National Electrical Contractors Association (NECA)
e. National Electrical Contractors Association (NECA) - ABA
f. National Electrical Contractors Association (NECA) - ABA
g. National Electrical Contractors Association (NECA) - ABA
h. National Electrical Contractors Association (NECA) - ABA
i. National Electrical Contractors Association (NECA) - ABA
j. National Electrical Contractors Association (NECA) - ABA
k. National Electrical Contractors Association (NECA) - ABA
l. National Electrical Contractors Association (NECA) - ABA
m. National Electrical Contractors Association (NECA) - ABA
n. National Electrical Contractors Association (NECA) - ABA
o. National Electrical Contractors Association (NECA) - ABA
p. National Electrical Contractors Association (NECA) - ABA
q. National Electrical Contractors Association (NECA) - ABA
r. National Electrical Contractors Association (NECA) - ABA
s. National Electrical Contractors Association (NECA) - ABA
t. National Electrical Contractors Association (NECA) - ABA
u. National Electrical Contractors Association (NECA) - ABA
v. National Electrical Contractors Association (NECA) - ABA
w. National Electrical Contractors Association (NECA) - ABA
x. National Electrical Contractors Association (NECA) - ABA
y. National Electrical Contractors Association (NECA) - ABA
z. National Electrical Contractors Association (NECA) - ABA

2. The Contractor shall have had experience on at least two projects involving the installation of electrical systems in buildings of similar size and complexity. The Contractor shall provide a list of references and a list of projects completed within the last three years.

3. The Contractor shall be responsible for the cost of the materials and labor required for the installation of the electrical system.

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WIRING
1. Unless otherwise specified or specifically indicated on the drawings, all wiring shall be in accordance with the National Electrical Code (NEC) and the National Fire Protection Association (NFPA) - NEC. The Contractor shall be responsible for the cost of the materials and labor required for the installation of the electrical system.
2. In lieu of a separate green grounding wire and grounding bushings, flexible metallic raceway for connection of lighting fixtures may be used as the grounding conductor if a locking type construction that provides a positive connection to the raceway is provided.
3. The Contractor shall match the color coding that is being used in the building; any deviation due to limited quantities of cable may be permitted upon written approval of the Engineer.

120/240V	System Voltage	277/480V
Black	Phase A	Brown
Red	Phase B	Orange
Blue	Phase C	Yellow
White	Neutral	Gray
Green	Ground	Green

CONNECTIONS
The wiring for lighting, receptacles including outlets for miscellaneous devices and for electric power, including all 120/240V connections into the cellular floor systems shown on the drawings, shall be furnished and installed complete from point of service connection to all outlets indicated on drawings.

CABLE SPlicing
1. No splices or joints will be permitted in either feeders or branches except at outlets or accessible terminals, splice or junction boxes.
2. All materials required for making splices and/or terminations shall be supplied in complete kits not older than 6 months; the Contractor shall also be responsible to insure that all materials furnished will not adversely affect the physical or electrical properties of any other, or of the wire or cable itself. Kits shall be manufactured by Mac-Tron Inc., Kearny, N.J. or approved equal.

3. Where the Contractor makes connections to existing wires, he shall open and disconnect the existing splices from such wires and install new splices to include the existing as indicated.
4. All splices for wire sizes #10 and smaller shall be made with insulated spring connectors applied to twisted conductors. Two half lapped layers of vinyl tape extending a distance of not less than one inch from the connector shall be applied. Splices other than the aforementioned, will be permitted at the discretion of the Engineer.

LIGHTING FIXTURE HOOKUP WIRE
1. Splice shall not be permitted in any run of fixture hookup wire.
2. Connections to branch circuit conductors and to existing fixture wiring shall be made and installed using spring connectors or crimp type connectors.

IDENTIFICATION OF WIRES
1. All wires shall be identified by circuits in all cabinets, boxes, wiring troughs and other enclosures, and at all terminal points, i.e., receptacles, etc.
2. The circuit designations shall be as shown on the contract drawings, or as directed by the Engineer. Tags shall be attached to wires so that they will be readily visible.

3. Brady, 8-500 vinyl cloth wire and terminal markers shall be used for all wire identification.
LIGHTING FIXTURES

General
1. This clause of the Specification covers the furnishing of labor, materials, equipment and the installation of all indoor and outdoor lighting fixtures, lighting equipment and the installation of lamps for all the electrical outlets in the building, including the connection of fixtures and equipment to the electric wiring system as shown on plans. As specified hereinafter, certain fixtures shall be furnished by the Contractor while others will be furnished by the Authority for storage, installation and connection by this Contractor.

2. The Contractor is directed to review the applicable Architectural and Electrical drawings for details on fixture construction and installation details for fixtures to be furnished by the Authority. The drawings represent a concept, not a final design, and reasonable changes to design may be made by the Authority.
3. All luminaires and lighting equipment shall be furnished to the premises complete, including all mounting accessories and components necessary for the proper operation of the equipment exclusive of lamps, whether furnished by the Contractor or by the Authority.

4. All fixtures and components shall be made in accordance with the National Electrical Code, all local codes applying and shall conform to all applicable requirements of the Underwriters Laboratories, Inc.
5. All recessed fixtures furnished by the Authority will be furnished with fixture wiring only. The Contractor shall provide wiring extensions in flexible conduit and necessary fittings to complete the wiring system connections.

Lamps
Lamps shall be those manufactured by General Electric, Westinghouse, or Sylvania. All fluorescent lamps shall be warm white-watt meter where applicable. Incandescent lamps shall be rated at 125 volts except where otherwise noted. The Contractor shall install new lamps in all new fixtures and fixtures that are supplied by the Authority. The Authority can supply fluorescent lamps for base building type fixtures only. All other lamps shall be furnished by the Contractor. "Supplied by" shall mean "may be purchased from."

Prior to acceptance and final payment, all lamps which are missing, burnt-out or broken shall be furnished or replaced by the Contractor.

Installation and Location of Fixtures
Fixture locations as indicated on the electrical drawings are general and approximate. The Contractor shall carefully verify fixture locations with Architectural plans, reflected ceiling plans and other reference data prior to installation.

Wiring
1. Wiring between fluorescent lampholders and associated operating and starting equipment shall be of the same or heavier gauge than the leads furnished with the approved types of ballasts and shall have equal or better insulating and heat-resisting characteristics. All other wiring within fluorescent lighting fixtures or from the fixture to the splice with the building wiring shall conform to the requirements of the latest published issue of the National Electrical Code.

2. Unless otherwise specified or shown on drawings, all wiring in conjunction with incandescent fixtures shall conform to the requirements of the latest issue of the National Electrical Code and shall be not less than No. 16 Gauge. Wiring shall be protected with tape or tubing at all points where abrasion is likely to occur. Wiring shall be concealed within fixture construction, except where the fixture design or mounting dictates otherwise.

3. Connections of wires to terminals of lampholders and other accessories shall be made in a neat and workmanlike manner and shall be electrically and mechanically secure with no loose strands protruding. The number of wires terminating to or from the terminals of a lampholder or other accessory shall not exceed the number which the accessory is designed to accommodate.

4. Joints in wiring within lighting fixtures and connections of the fixture wiring to the wiring of the building shall be so placed that they will be mechanically and electrically secure and then soldered and taped to provide insulation equal to that of the conductors being joined. In lieu of solder and tape, approved types of adequately insulated adhesive pressure crimped type connectors may be furnished, provided also used, method of application and tools employed are in accordance with the connector manufacturer's recommendations.

5. Wiring channels and wireways shall be free from projections and rough and sharp edges throughout and all points or edges over which conductors must pass and may be subject to injury or wear shall be rounded or bushed. Insulated bushings shall be installed at all points of entrance or exit of flexible wiring.

Fluorescent Lamp Ballasts
1. Ballasts shall provide and ensure safe and reliable operation of the particular fluorescent lamps specified for each fixture type. Ballasts shall be of high power factor type, rated class "P", series or max-minor where applicable—sequence for operation of Rapid Start Lamps.

2. The ballast shall be protected by a minimum of a one year guarantee starting from the date of acceptance of the installed fixtures, against defects in workmanship and material which includes an in-warranty service program providing for the payment of qualified labor charges incurred in the replacement of inoperative in-warranty ballasts.

3. All ballasts shall be UL listed Class "P" type.

Supports
1. Recessed fixtures shall be furnished complete with mounting devices and accessories. Where necessary to meet code requirements, enclosure housings shall be suitable for a 1 hour fire rating or concrete pour requirements. Attachment devices including brackets, plaster rings, saddle hangers, and tie bars shall be made of formed or rolled metal shapes with the requisite rigidity and strength to maintain continuous alignment of the installed fixtures.

2. Fixtures shall be attached to ceiling supporting members and shall not depend on lath or plaster for alignment or support. Fixtures in suspended ceiling shall be supported by saddle hangers or tie bars attached to runners or between crossbars of ceiling systems. Mounting spines or other positive means of maintaining alignment and rigidity shall be provided. Supporting members shall be surface passivated, and shall be primed or paint dipped to resist corrosion. Fastening devices shall be of a positive, locking type, and shall not require the use of special tools to apply or to remove. Tie wires shall not be used in place of fastening devices.

FINAL CLEANUP AND FIELD TESTS
After completion of the entire electrical installation:
1. The Contractor before final acceptance will be granted, shall clean all lighting fixtures, glassware, panels, cabinets, device plates, service fittings and other items furnished under this contract, and shall insure that all directories are in place with completed or revised schedules and all identification or markings of equipment, cables, and other items, are completed.

2. The Contractor shall repair or replace, as directed by the Engineer, at no additional cost to the owner, any item damaged due to installation, relocation or reinstallation.

3. In addition to any tests that may be required in the various other disciplines, perform field tests in the presence of the Engineer, to demonstrate the reliability of the electrical installation. Give the Engineer 48 hours advance notice of such tests. The following field tests shall be performed by the Contractor:
a. Operate all electrical equipment for a period of 24 hours, unless otherwise directed by the Engineer.

b. Test all wires and cables installed under this contract with a 1000 volt Megohmmeter. Furnish the Engineer a copy of the results together with an outline of the method used. If in the opinion of the Engineer, any readings are lower than required by good practice or applicable codes promptly replace the equipment or materials involved.

c. Should the foregoing tests reveal any defects, promptly correct the defects and re-run such tests until the entire installation is satisfactory in all respects.

POWER INTERRUPTION NOTICE
Electrical power must be shut off prior to the Contractor performing any work in raceways with live electrical circuits or on any other live electrical circuits or equipment. Power interruption will be permitted only between the hours of 6 P.M. and 8 A.M. The actual dates, time and duration of all power interruptions shall be subject to prior approval of the Engineer.

CORE DRILLING
Core drilling will be permitted only between the hours of 6 P.M. and 8 A.M. Cored holes shall be a minimum of 16 inches center to center between all new and/or existing cored holes, including those abandoned and filled with concrete. Cores shall be of (4") maximum diameter.